

Controlling Cholesterol

lowering LDL *and* triglycerides *and* increasing HDL

by Miles Hassell MD

This handout is excerpted from *Good Food, Great Medicine* (3rd edition), a Mediterranean diet and lifestyle guide and cookbook. *Good Food, Great Medicine* is a practical, easy-to-read resource offering both the evidence and the tools to help prevent or reverse heart disease and type 2 diabetes, control high blood pressure, improve cholesterol levels, reduce risk of stroke, dementia, and cancer, and lose weight without deprivation. The *Risk Reduction Action Plan* (page 69) includes the most effective lifestyle choices to improve cholesterol by controlling LDL, raising HDL, and lowering triglycerides. A couple of success stories illustrate the powerful impact these choices can have on our risk factors. (For more principles to eat by, see *Fat Is Good, Bagels Are Bad* on the resources tab at goodfoodgreatmedicine.com)

LIFESTYLE CHOICE #11

CONTROL LDL CHOLESTEROL

An apple a day...

Goal:

- Your goal LDL can vary depending on other risk factors and the guidelines your doctor uses. A starting point is an LDL of less than 160 mg/dl in low-risk patients or 70-100 mg/dl in high-risk patients. Some guidelines dispense with targets like these, and have a sort of “statins for all” approach. The suggestions here are most relevant to those who don’t need statins (commonly used cholesterol lowering drugs), or tolerate them poorly.

Low-density lipoprotein (LDL) is a form of cholesterol strongly related to increased risk of heart disease, particularly in those with other risk factors for heart disease. Although controlling your LDL is important, don’t rely on a low LDL alone; nearly half of the people who have heart attacks in the U.S. have LDL levels that are close to historical guidelines.¹

Some foods to lower LDL

LDL-lowering foods can be incorporated easily into your diet; each one can typically lower LDL by 3–10%. When used in combination, these foods can typically lower LDL up to 30% (similar to a medium dose of a statin drug), lower triglycerides, raise HDL, improve blood sugar control, and lower levels of inflammation. We have seen LDLs drop by 50% with vigorous use of these foods. The more you use *on a daily basis*, the greater the benefit. The higher your LDL, the better they work. (Give any food program about 6 weeks to start working.)

- **A Mediterranean-style diet** is associated with a fall in LDL cholesterol of up to 10% as well as lower and safer levels of oxidized LDL. This reduction in LDL oxidation may be more important than lowering total LDL.
- **Psyllium (e.g. Metamucil):** Ten grams daily (about 2 heaping teaspoons) can reduce LDL by about 7%.² In some studies, psyllium failed to lower LDL but helped raise HDL and lower triglycerides.³ Stir it into a small amount of water, drink it quickly before it gels, and then follow with 12 ounces of water. It is also a great anti-constipation agent.

¹ Sachdeva, A. et al. Am Heart J 2009;157:111-7

² Anderson, J.W. et al. AJCN 2000;71:472-9

³ Sola, R. et al. AJCN 2007;85:1157-63

- **Oat bran:** Four tablespoons (¼ cup) daily may reduce LDL 10–26%.¹ It can be eaten with cereal, stirred into yogurt, or added to muffins. (See *Extreme Muffins* on page 269.) Cooked whole oats, barley, and rye are expected to have a similar effect because of their viscous soluble fibers.
- **Raw nuts:** (see page 27) About 2 handfuls (for example, about 30 almonds or 2 ounces) daily can reduce LDL by 7–10%. Adding raw nuts to your diet can reduce oxidized LDL as well as another risk factor called Lp(a).^{2,3}
- **Apples, fresh and dried:** About 2 ounces daily of dried apples or about two whole apples daily can lower LDL by 23% and C-reactive protein by 32%, and lower lipid oxidation and body weight.⁴ Whole or dried pears may have a similar effect. One British analysis⁵ states that an apple a day may save as many lives as a cholesterol-lowering drug.

When assessing the LDL-lowering effect of food, compare the degree of benefit with the fact that doubling any given dose of a statin drug will typically lower your LDL by only another 6–9%. For example, eating an extra apple a day, as suggested in the British study above, may give the equivalent effect of doubling a statin dose.

- **Dark chocolate:** 1–3 ounces daily may lower LDL 5–10%. Choose chocolate with 70–90% cocoa content⁶ (page 38).
- **Eggplant and okra:** About 6 ounces of eggplant or 3–4 ounces of okra every other day can lower LDL. They have not been studied by themselves, but when used in combination with other factors, have been found to lower LDL by 28% and reduce inflammation.⁷

- **Beans:** ½-cup of cooked pinto beans⁸ or 25 grams of soy protein can lower LDL 5–8% or more. (Soy is best included in the form of whole traditional soy foods – see page 22.) Other beans and legumes seem to work, too.⁹
- **Probiotic foods** may lower LDL a little – see page 32.
- **Cinnamon:** ½–2 teaspoons daily might reduce LDL about 5%.¹⁰
- **Lycopene:** 25mg daily might lower LDL by about 10%.¹¹ Natural sources include tomatoes, watermelon, and pink grapefruit.
- **Red yeast rice:** A non-prescription supplement with variable amounts of naturally-occurring statins, and less predictable than prescription statins.
- **Niacin** is also used sometimes, and we discuss this more on page 87.

Medications to lower LDL

Prescription statins have many benefits and we prescribe them often. However, the consistent use of the lifestyle approaches we recommend will allow some to reduce or even eliminate statins, which is especially good news for those who experience significant side effects from statin drugs.

Stanols or phytosterols to lower LDL

I don't recommend stanol-containing margarines to lower LDL cholesterol because of concerns over the hydrogenated oils in the margarine, and the debate over whether stanols at these doses have potential for harm.^{12,13}

¹ Romero, A.L. et al. JACN 1998;17:601-8

² Jenkins, D. et al. Circulation 2002;106:1327-32

³ Sabate, J. et al. Arch Intern Med 2010;170:821-7

⁴ Chai, S.C. et al. The FASEB Journal 2011;25:971.10 (abstract)

⁵ Briggs, A. et al. BMJ 2013;347:f7267

⁶ Tokede, O.A. et al. Eur J Clin Nutr 2011;65:879-86

⁷ Jenkins, D. et al. JAMA 2003;290:502-10

⁸ Winham, D.M. et al. JACN 2007;26:243-9

⁹ Ha V. et al. CMAJ 2014 doi:10.1503/CMAJ.131727

¹⁰ Allen, R. et al. Ann Fam Med 2013;452-9

¹¹ Reid, K. and Fakler, P. Maturitas 2011;68:299-310 (Meta-analysis)

¹² Fransen, H.P. et al. J Nutr 2007;137:1301-6

¹³ Danesi, F. et al. Br J Nutr 2011;106:540-8

LIFESTYLE CHOICE #12

RAISE HDL CHOLESTEROL and LOWER TRIGLYCERIDES

Eat, play, laugh.

Goal:

- For lower heart disease risk, it is better to have an HDL higher than 45 mg/dl for men and 55 mg/dl for women, and triglycerides under 150 mg/dl (less than 100 mg/dl may be optimal). However, using drugs to increase HDL has not been generally beneficial for improving health outcomes – this takes lifestyle change.

Low HDL and high triglycerides are both important risk factors and imply broader metabolic dysfunction with relevance beyond heart disease – most people with low HDL and high triglycerides have insulin resistance and are at increased risk of not only heart disease and stroke, but also type 2 diabetes, dementia, and some cancers. The lifestyle solutions to these separate-but-related issues are similar, so this step will combine them.

HDL cholesterol explained briefly

High density lipoprotein (HDL) is called the “good” cholesterol; it transports cholesterol back to the liver (away from the arteries), improves the blood clotting process, and discourages atherosclerosis by helping protect LDL cholesterol from oxidation. A higher HDL also protects against heart attacks – for example, a low HDL of less than 35 mg/dl indicates a risk of future heart attack 3–4 times greater than a high HDL. The ratio of total cholesterol divided by HDL (TC/HDL) is another way to assess risk of heart disease. Lower is better – aim for less than 4. A related number, non-HDL cholesterol (total cholesterol minus HDL), is also frequently used. (My HDL recommendations are based on the levels of HDL cholesterol associated with “average” heart disease risk in the *Framingham Heart Study*¹.)

¹ Castelli, W. *Am Heart J* 1983;106:1191-200

Key HDL points to know:

- **Treating low HDL usually requires many lifestyle steps**, each of which may raise HDL about 5–15%. When combined, these steps can increase total HDL by as much as 50–100% or even higher.
- **An increase in HDL by 7.5%** while controlling LDL is associated with regression of coronary artery atherosclerosis in several of the best heart disease prevention trials, and suggests disease reversal is occurring.²
- **The benefit of raising HDL with lifestyle change probably extends far beyond a reduction in heart disease risk.** Most changes that improve HDL are associated with lower risk of other diseases: stroke, high blood pressure, cancers, obesity, and diabetes.
- **Even tiny improvements in HDL are associated with reduced heart disease.** It is estimated that every 1 mg/dl improvement in HDL lowers heart disease risk by up to 4%, thus a seemingly modest 5 mg/dl increase in HDL may translate into up to 20% less risk.
- **Medications** to improve HDL have been disappointing, so we rely on lifestyle choices to achieve our HDL goals.

Laugh more!

“A merry heart doeth good like a medicine...”³ When put to the test, this proverb shows real results. In a one-year study of patients with abnormal cholesterol, high blood pressure, and type 2 diabetes, the group that spent 30 minutes each day with self-selected humor had a 26% increase in their HDL compared with 3% in the control group, and a 66% drop in their hsCRP (a measure of inflammation), compared with 26%.⁴ (By the way, the rest of the proverb is “...but a broken spirit drieth the bones.” Let’s learn to laugh more.)

² Nicholls, S. et al. *JAMA* 2007;297:499-508

³ Proverbs 17:22 KJV

⁴ Berk, L. American Physiological Society Annual Meeting, April 2009

Ten lifestyle steps to increase HDL and lower triglycerides:

1. **Exercise** between one-half to one hour most days to raise HDL by 10–20% and lower risk of death and future heart “events” by 30–60%. The longer the duration and the greater the intensity of exercise, the better.
2. **Eat more vegetables, beans, and whole grains and less sugar¹ and refined grains.** (Grains can be a complex issue – see pages 23-25 and 46-47.)
3. **Eat more omega-3 fats and other good fat** (not *low-fat*). This helps raise HDL and lower triglycerides, while low-fat diets usually have the *opposite* effect of raising triglycerides and lowering HDL. Raw nuts, oil-rich fish and shellfish, freshly-ground flaxseeds, and some green leafy vegetables are sources of omega-3 fats. Other good fats like extra-virgin olive oil (see pages 26-27) are also helpful.
4. **Include eggs, cheese, and meat** as part of a varied whole food diet.
5. **Avoid trans fats** and foods containing hydrogenated and partially-hydrogenated oils. (See page 47.)
6. **Maintain a healthy waistline and weight** to help raise HDL 5–10% and lower triglycerides. (See page 60.)
7. **Drink a small amount of alcohol daily** to help raise HDL 5–10% and lower heart disease and diabetes risk. Larger amounts raise triglycerides, so watch the dose. *Limit to one drink per day.* (See page 39.)
8. **Eat up to one ounce of dark chocolate** (greater than 70% cocoa content) daily to help raise HDL 5–10%. (See page 38.)
9. **Cinnamon:** ½–2 teaspoons daily may slightly lower triglycerides and raise HDL.²

10. **Consider using fish oil and niacin in selective situations.** Lifestyle changes are very effective for lowering triglycerides in most people, but medications can also help. I sometimes prescribe high-dose fish oil (see page 88) and niacin (a B vitamin), which in very high doses can lower triglycerides and LDL and raise HDL. Niacin might be appropriate for those with low HDL, high triglycerides, *and* who have not had adequate LDL cholesterol-lowering with statin drugs – or do not tolerate them.

Niacin: Is it safe? Does it work?

The AIM-HIGH study³ has caused us to be less certain about the use of niacin. AIM-HIGH showed no benefit for niacin added to other cholesterol-lowering therapies, in contrast to forty years of data showing benefit in various less-rigorous smaller trials.⁴

Another large study that did not show benefit for niacin when added to typical statin therapy, HPS2-THRIVE,⁵ is harder to interpret because it used niacin with another drug, laropipant. It may be that niacin offers the most benefit for those who get insufficient results from statins, or who do not tolerate statins. Niacin has potential (but fairly uncommon) side effects including gout, elevated blood sugar, and liver problems, and should be used with physician supervision. Less worrisome (but very common) side effects include flushing, itching, and other skin symptoms, which can be minimized; the suggestions in this handout can help.

¹ Welsh, J.A. et al. JAMA 2010;303:1490-7

² Allen, R. et al. Ann Fam Med 2013;452-9

³ AIM-HIGH, NEJM 2011;365:2255-67

⁴ Bruckert, E. et al. Atherosclerosis 2010;210:353-61

⁵ HPS2-THRIVE, NEJM 2014;371:203-12

How to use niacin

Side effects can be minimized by following these directions:

For immediate release crystalline (non-prescription) niacin: start with 250 mg with your evening meal. After one week, add another 250 mg at lunch. After another week, add another 250 mg at breakfast. Now you are taking 250 mg three times daily. Some people can now increase the dose to 500 mg three times daily for a month, and then increase the dose until they are taking 1,000 mg three times daily. Some get excellent results with just two doses daily. Immediate release niacin is inexpensive, and works very well for those who can tolerate it.

For extended release or slow release niacin (like *Niaspan*, *Endur-Acin*, and *Slo-Niacin*): start with 500 mg at bedtime and increase by 500 mg every 2–4 weeks, for a maximum of 2,000 mg daily:

- **Niaspan** is *prescription* niacin and is used once a day at bedtime. Niaspan is also available combined with simvastatin (**Simcor**), which combines the benefits of both a statin medication and niacin.
- **Endur-Acin** and **Slo-Niacin** (both non-prescription) are used one or two times daily with physician supervision. If using twice daily, close blood monitoring is required. Use only those which have been examined for efficacy and safety in peer-reviewed studies, such as Slo-Niacin and Endur-Acin.¹

Niacinamide and No-Flush Niacin (inositol hexanicotinate) are forms of niacin that do not effectively lower cholesterol.²

Whichever form of niacin you use, your doctor needs to be involved. *Blood tests should be done after you reach a total daily dose of 1,000 mg, and then after every 500 mg increase.*

¹ Ito, M. et al *Pharmacotherapy* 2006;26:939-1010

² Meyers, C. et al. *Ann Intern Med* 2003;139:996-1002

Give niacin time!

If you haven't used niacin before, it may seem like a nuisance. However, for most people with low HDL cholesterol, a treatment program including niacin appears to be the most beneficial in terms of reducing their risk of death or future heart attack, especially if niacin is combined with a statin medication. After a few weeks many people experience little or no side effects from niacin. Everyone is different. Some tolerate only small doses of niacin, like 500–1,000 mg daily, but even at lower doses there are very useful benefits.

Tips to reduce niacin side effects

- Taking niacin with food, especially a high-fiber snack, like a piece of whole fruit, (or even Metamucil), will also reduce the flushing. One combination that minimizes the niacin flush for some people is 2–4 tablespoons of oat bran mixed with unsweetened applesauce and eaten with the bedtime niacin dose. Another idea is to eat a handful of raw almonds or walnuts with the niacin.
- Do not increase your dose of niacin until you are tolerating the current dose.
- Aspirin helps reduce the side effects of niacin, so if you are taking aspirin, take it at the same time as your niacin.
- When first using niacin, avoid taking it with hot drinks, alcohol, or spicy foods, all of which can aggravate a reaction.

Lowering triglycerides

High triglycerides are linked to a peculiar form of LDL cholesterol (small dense LDL) that increases your risk of blocked arteries, and the basic steps to lower them are the same as those to raise HDL (on previous page). One point that needs particular emphasis is that the main dietary cause of high triglycerides is too much sugars and refined grains. Low fat diets often drive high triglycerides even higher!

Fish oil supplements

These have not shown the same degree of benefit as eating oil-rich fish. (See page 28.) However, we occasionally use fish oil for patients with high triglycerides, heart failure, and other conditions such as inflammatory joint disease, inflammatory bowel disease, depression, and anxiety. When choosing fish oil, read the label for EPA + DHA fatty acid content – they vary widely.

- **3–4,000 mg daily of EPA + DHA may lower triglycerides by 30–50%.** To get that dose you have a number of options, including prescription and over-the-counter capsules containing EPA and DHA from fish, algae, or krill, or even liquid fish oil or cod liver oil. Cod liver oil has the advantage of containing a useful dose of natural vitamin D. When using cod liver oil, check the label to make sure you are not getting more than about 5,000 IU daily of vitamin A.

Dealing with the taste and the after effects of fish oil (burping)

We prefer liquid fish or cod liver oil with lemon, and most people find it acceptable. To minimize burping, store the oil in the refrigerator and take it immediately before your largest meal. The same holds for fish oil capsules, and some people report a greater burp-free benefit if they are stored in the freezer.

REAL WORLD SUCCESS STORIES

Paul reversed high-risk cholesterol and dropped his blood pressure

He was a 59-year-old project manager who came in with unusually high triglycerides at 1,332 mg/dl and hypertension (he was on 2 blood pressure medications). He began regular exercise (about 20 minutes on an uphill Nordic track 4 days per week), ate more vegetables, protein, and good fats, and cut way back on sugars and other refined carbs. Six months later his triglycerides had plummeted to 70, his blood pressure dropped from 152/90 to 138/76, and his blood pressure drugs were eliminated. He improved his total cholesterol:HDL ratio from 5.8 to 3.5, raised his HDL (good) cholesterol from 28 to 45, and lost about 15 pounds.

Milt reversed high triglycerides and low HDL cholesterol

He was a 50-year-old firefighter referred to our office because his HDL and triglyceride levels suggested a high risk of premature heart disease, diabetes, and pancreatitis. His HDL was low at 34 mg/dl, and his triglycerides were very high at 961 mg/dl, despite appropriate treatment with conventional medications and an excellent exercise program. Milt made many changes in his diet: he replaced low-fat foods with good fat (such as whole milk dairy products, raw almonds, and extra-virgin olive oil), had a tablespoon of fish oil daily to help lower triglycerides, ate more vegetables and whole fruit, and sharply reduced his intake of “weight loss” shakes, juices, sweets, processed meats, breads, potatoes, and rice. Finally, he ate more meals at home and began bringing lunch to work. The results were stunning. After only a few months, and with no additional medications, his triglycerides dropped from 961 to 165 and his HDL improved from 34 to 46. Along with enjoying a much lower risk of future disease, he feels better and has more energy.

Miles Hassell MD is an internist in private practice at Providence St. Vincent Medical Center in Portland, Oregon, where he lives with his wife Anna and son Tor. He was born in Seattle, Washington, and was raised in Perth, Western Australia, receiving his medical degree from the University of Western Australia. He completed his residency in Internal Medicine at Providence St. Vincent Medical Center.

Dr. Hassell established the [Integrative Medicine Program](#) at Providence Cancer Center in Portland and is a clinical instructor in the training of Internal Medicine residents, twice named *Outstanding Teacher of the Year*. He also lectures widely to physician groups about the appropriate integration of lifestyle and conventional medicine, and is often interviewed on health issues by local television and radio. He is the co-author of *Good Food, Great Medicine*, an evidence-based guide to using a whole food Mediterranean diet in the pursuit of optimal health.

In his private practice Dr. Hassell encourages the vigorous use of evidence-based food and lifestyle choices and has been chosen as one of *Portland's Top Doctors*. Dr. Hassell is available for individual consultations for diagnosis, second opinion, or to develop patient-centered solutions using evidence-based conventional and lifestyle interventions.

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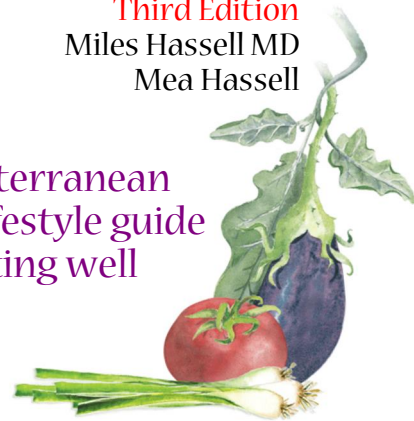
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